II. Physical Properties; the posts themselves

A. FLEXURAL STRENGTH

Galhano, GA, Valandro, LP, deMelo, R., Scotti, R., Bottino, MA. **Evaluation of the flexural strength of carbon fiber, quartz fiber and glass fiber – based posts.** ***JOE Vol. 31. No. 3, March 2005, 209-211***

This study investigated the flexural strength of 8 fiber posts (one carbon fiber, one carbon/quartz fiber, one opaque quartz fiber, two translucent quartz fiber and three glass fiber posts). Eighty fiber posts were used and divided into 8 groups (n=10): G1- **Composipost** (RTD), G2-Aestheti-Post (RTD), G3- **Aestheti-Plus** (RTD), G4- **Light-Post** (RTD), G5- D. T. Light-Post (RTD), G6- ParaPost White (Coltene/Whaledent), G7-FibreKor (Pentron) and G8-Reforpost (Angelus). All of the samples were tested using a three-point bending test. Statistical analysis of the outcomes was conducted by means of analysis of variance and the post factor was significant ($p<0.001$). The critical value for comparison revealed that G2 (677.4 MPa +/18.3) and G3 (666.2 +/- 18.1) presented the highest flexural strength values. G1 (616.3 +/- 24.8) and G3 presented similar strengths. G1, G4 (607.2 +/- 19.5), G5 (608.7 +/- 69.5), G6 (585.2 +/- 24.2) and G7 (562 +/- 59.6) were statistically similar. Reforpost-G8 (433.8 +/- 46.4) revealed the lowest flexural strength value compared to the other groups.

Plotino G, Grande NM, Bedini R, Pameijer CH, Somma F **Flexural properties of endodontic posts and human root dentin**. Dent Mater J. 2006 Nov 18;

OBJECTIVES: To evaluate the flexural modulus and flexural strength of different types of endodontic post in comparison with human root dentin. METHODS: Three different types of fiber-reinforced composite (FRC) posts and three metal posts each comprising 10 specimens (n=10) and 20 dentin bars were loaded to failure in a three-point bending test to determine the flexural modulus (GPa) and the flexural strength (MPa). Three randomly selected fiber posts of each group were evaluated using a scanning electron microscope (SEM) to illustrate the differences in mode of fracture. Data were subjected to a one-way ANOVA to determine significant differences between groups and the Bonferroni t-test multiple comparison was applied to investigate which mean values differed from one another with significance levels of $P<0.05$. RESULTS: The flexural modulus recorded for the dentin bars was 17.5+/-3.8GPa. The values for posts ranged from 24.4+/-3.8GPa for silica fiber posts to 108.6+/-10.7GPa for stainless steel posts. The flexural strength for dentin was 212.9+/-41.9MPa, while the posts ranged from 879.1+/-66.2MPa for silica fiber posts to 1545.3+/-135.9MPa for cast gold posts. The ANOVA test analysis revealed significant differences between groups ($P<0.05$) for flexural modulus and flexural strength mean values. SIGNIFICANCE: FRC posts have an elastic modulus that more closely approaches that of dentin while that for metal posts was much higher. The flexural strength of fiber and metal posts was respectively four and seven times higher than root dentin.

B. LIGHT CONDUCTIVITY

Faria, E. Silva AL, Arias V.G, Soares LE, Martin AA, Martins LR .**Influence of Fiber-post Translucency on the Degree of Conversion of a Dual-cured Resin Cement**. ***J Endod. 2007 Mar;33(3):303-5.***

This study evaluated the degree of conversion of one dual-cured resin cement when used to lute fiber posts with different translucencies. To measure the degree of conversion, polyvinylsiloxane molds were prepared to simulate root canals. The posts, **Aestheti-Post** or **Light-Post**, were cemented in these molds and, after photoactivation, were removed to obtain the resin cement spectrum by FT-Raman spectroscopy. Spectra were acquired at three depths: superficial, medium, and deep. For Light-Post, the resin cement at deep depth showed the lowest degree of conversion and no significant difference in degree of conversion was found between the other depths. For Aestheti-Post, the superficial depth presented a higher degree of conversion values than those in the medium and deep depths, which were not significantly different from each other. Light-Post exhibited a higher degree of conversion than that of Aestheti-Post only at medium depth. Light-Post effectiveness regarding the degree of conversion is dependent on the depth.

Sawada, N, Hikage, S, Sakaguchi, K, **Shape of composite resins photopolymerized by the translucent post**. ***J Dent Res.81 IADR Abstract #2569; 2002***

Objectives: The purpose of this study was to investigate light transmission of a glass fiber post (GFP **LIGHT-POST** #3; RTD) from the shape of polymerized dental resins. **Materials and Methods**: The GFP was inserted into composite resins (LITE-FIL II A Shade E1 and LITE-FIL II P Shade A3 (Shofu) in a 1.5ml microtube. The upper end of the post was irradiated with a visible light generator (Griplight II, Shofu) for 20, 40 or 60 seconds. After polymerization, the unpolymerized resin around the GFP was measured. The length (A) of the polymerized resin, the diameter (B) of the upper surface and the diameter (C) of the resin 10mm below (B) were measured. Three samples were measured for each set of conditions. The data were statistically analyzed by Student's t-test. **Results**: Results showed that irradiation for 20 seconds was insufficient for polymerization, and the measurements of the samples were not possible. In the E1 resin, the value for (A) after irradiation for 60 seconds (15.5 +/- 0.3mm) was significantly larger than after 40 seconds (13.7 +/- 1.1mm) ($p<0.05$). In addition, the diameters of (B) were 3.7 +/-0.3 (40 seconds) and 5.3 +/- 0.3 (60 seconds), and the diameters of (C) were 6.7 +/- 0.7 (40 seconds) and 8.8 +/- 0.2 (60 sec). In the A3 resin, the extent of the resin polymerization was smaller than that in E1, although the value for (A) in the A3 resin was not significantly different from that in E1. **Conclusions**: Consequently, it was concluded that the composite resins were photopolymerized using the GFP. These results suggest that irradiation of a GFP (LIGHT-POST #3) for over 40 seconds can effectively polymerize a highly translucent resin in clinical practice.